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ABSTRACT

The project described in this executive summary was designed to identify: the unmet vocational rehabilitation training needs of state agency staffs; courseware being used; other training materials being used or needed in the future; and the potential of telecommunications technologies to deliver the needed training. The project's oranizational and research activities reported in this study include: (1) an intensive case study of the pilot states, a survey of training needs and present training delivery methods, and the survey data analysis; (2) an analysis of the human and organizational factors affecting telecommunication use and a review of needed and available software; (3) the identification of potential telecommunications alternatives and their costs; analysis of their cost effectiveness relative to traditional delivery methods, and preparation of test and evaluation plans for the most promising alternatives; (4) the identification of state and federal government factors affecting the delivery of public sector telecommunication alternatives; and (5) the development and production of a media package describing the project, introducing telecommunication concepts, and highlighting the results of the project. (Author/RAO)

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STAFF TRAINING VIA TELECOMMUNICATIONS: ANALYSIS OF NEEDS AND DELIVERY ALTERNATIVES

FINAL REPORT - EXECUTIVE SUMMARY

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We are particularly indebted to the Project Advisory Committee who worked with us throughout the entire study, and whose efforts significantly enhanced the quality of the study. Mary Shortall and Carroll Hostetter graciously shared information from their states, introduced us to their colleagues and made it possible for us to benefit greatly from the pilot studies in Minnesota and Oklahoma.

We would also like to acknowledge the contributions of the audiovisual Content Committee. This committee gave guidance on the design and content of the project's audiovisual products, and reviewed and approved the script prior to final packaging.

The project monitor, Lita Colligan of the Rehabilitation Services Administration, took a deep interest in the study and provided many valuable suggestions.

FII

EXECUTIVE SUMMARY

Introduction

In October 1977, the Denver Research Institute (DRI) received a grant from the Rehabilitation Services Administration (RSA) to investigate the potential and cost-effectiveness of delivering vocational rehabilitation (VR) state agency staff training via telecommunication, and to prepare test and evaluation plans for those telecommunication alternatives having the greatest potential for use in staff training. The study was initiated in an attempt to develop methods to enhance the effectiveness of and participation in state agency staff training.

As part of their responsibility for receiving federal rehabilitation funds, state vocational rehabilitation agencies are required to provide ongoing training for all levels of state agency staffs. Several circumstances combine to make fulfillment of this requirement difficult using present training delivery methods. State agency funds for training and for personnel to do the training are limited in relation to the number and diversity of VR workers requiring training. In addition to the various levels of employees (i.e., counselors, clerical workers, administrators), there are differing requirements for specific or specialized information relevant to case work and most states have some employees isolated by geographic location or severe weather conditions.

Telecommunication has the potential to overcome these constraints by providing the ability to cost effectively reach a greater number of trainees than traditional methods, to fulfill the specialized information needs of practitioners in a more efficient and individualized way, and to overcome geographic or weather barriers. The purpose of this study, then, was to identify the unmet training needs of state agency staffs, the courseware, and other training materials presently being used in training as well as that needed in the future, and the potential of telecommunication technologies to deliver training to meet VR's overall training needs. In addition, a media package was to be developed highlighting the present and potential uses of telecommunications in VR.

This Executive Summary presents an overview of the project's organizational and research activities and highlights the outcome of the 18-month research effort. Volume I of this report presents the analysis of training needs data and costs obtained from extensive surveys sent to training officers and all levels of state agency staffs at state agencies in eleven states, to all Regional Rehabilitation Continuing Education Programs (RRCEP), and to all Rehabilitation Research and Training Centers (RTC). Our conclusions and recommendations concerning staff training needs, as well as the tabulated survey results, are included in Volume I.

Volume II contains three sections. Section I presents the results of the telecommunication-related tasks of the research, the recommended telecommunication methods for use in delivering VR staff training, and a discussion of the costs and cost-effectiveness of VR staff training delivery via telecommunication. In addition, test and evaluation plans for the most promising alternatives are included in this section. Section II details state and federal factors affecting the development of public sector telecommunication applications. Much of the research and writing for this section was performed by the Council of State Governments under the direction of John Dinsmore. Section III summarizes the media-related activities of the project and details the content of the audiovisual productions, which include two slide/sound shows and a color videotape derived from the basic script.

The benefits realized by the completion of this project exceed what is contained in these reports. Through continuous dialogue with VR practitioners across the country, extensive visits in two case study states (Oklahoma and Minnesota) and discussions with agencies and other groups interested in the use of telecommunication, a great deal of information concerning the applications and uses of telecommunication has been disseminated. The media products produced during the course of the work will be used by the Seattle RRCEP as part of a national short-term training program to train trainers on the use of

telecommunication and in a workshop for DHEW planners and managers about social services delivery systems using telecommunications. These media products discuss the existing and potential uses of telecommunication in VR and are directed primarily toward administrators. They provide concise telecommunication introductory materials for those administrators comtemplating the use of telecommunication in their agencies.

The real benefits of this research, however, will come from the efforts of VR personnel interested in the use of telecommunication who will use these results in developing programs or policies which will use tele-technologies to meet VR needs.

Highlights of the Project

Prior to official start-up of the project, numerous contacts were made with persons in the vocational rehabilitation field and related disciplines. These contacts provided a valuable source of information and direction. The initial tasks of the project involved calling upon these experts for consultation on finalizing membership on the Advisory Committee and on the best mix of states to participate in the training needs survey.

The Advisory Committee consisted of 21 persons, comprising vocational rehabilitation, training, counselor education, and telecommunication specialists. In forming the Committee, input was sought from the RSA project officer, regional office staffs, CSAVR, NRA, as well as other VR and training specialists. The Committee had representation from Regional Rehabilitation Continuing Education Programs, Rehabilitation Research and Training Centers, CSAVR, regional administrators, state agencies, counselor education, telecommunication, and counseling. A list of the members of the Project Advisory Committee may be found at the end of this summary.

The Committee met once in person in Denver in the fourth month of the project, participated in two telephone teleconferences, and were

often polled by telephone on issues of importance to the project. The ideas, advice, and direction provided by the Advisory Committee were invaluable to our research.

Selection of the survey states was based on geographic distribution, rural/urban mix, the vocational rehabilitation administrative arrangements (vocational rehabilitation and blind agency combined, blind agency alone, etc.), and the degree of existing telecommunication use. Two states of the 11 survey states were chosen for extensive study. These two pilot states were Minnesota and Oklahoma. The remaining survey states included Maine, West Virginia, Texas, Mississippi, Ohio, Washington, Michigan, Nevada, and Utah. Survey questionnaires were also sent to all RRCEP's and RTC's, although there was no prior agreement with these groups to participate in the project. The design and implementation of the surveys are discussed below.

As originally conceived, the project work was divided into 11 tasks. Of these 11 tasks, nine were responsive to the stated grant objectives, while the other two, the legislative task and the media task, were included because it was believed they would enhance the usefulness of the project and increase the effectiveness of the dissemination of project results. As the project work proceeded, the project team concluded that several of the 11 tasks were closely related and that these should be consolidated. As a result, the original 11 tasks were restated as five separate tasks for this report. Task 1 included the intensive case study of the pilot states, the survey of training needs and present training delivery methods, and the survey data analysis. Task 2 involved an analysis of the human and organizational factors affecting telecommunication use and a review of needed and available software. Task 3 included the identification of potential telecommunications alternatives and their costs, an analysis of their cost-effectiveness relative to traditional delivery methods, and preparation of test and evaluation plans for the most promising alternatives. Task 4 involved the identification of state and federal government factors affecting

the development of public sector telecommunication alternatives. Task 5 included the development and production of the media package. The restatement of tasks is reflected in the format of the report.

Survey of training and training needs. In order to identify potential telecommunication alternatives and to assess their cost-effectiveness for VR staff training, a network of VR state agencies was developed as a primary source of information on present training and training delivery methods. The two intensive study states were visited shortly after the project began. At least four local VR offices and the central administration were visited in both states to get an initial assessment of the different kinds of work, information needs, and training environments in which field staff and administrators operate. During our visits, informal meetings were held with all levels of staff, including administrators, secretaries, counselors, counselor aides, vocational evaluators, and RRCEP and R&T Center staffs.

Following our visits to the intensive study states, we were able to construct three draft questionnaires (one for VR staff, one for State Training Officers, and one for RRCEP and R&T Center programs) pertinent to the VR work and training environment. The draft questionnaires were then reviewed by the project Advisory Committee and a CSAVR representative after which the content and format were finalized.

The survey questions were primarily open-ended. Despite the perils of using this kind of question format, we believed this was necessary to obtain the diversity and quality of information desired. We had found in the pilot states that most VR staff and administrators were not familiar with telecommunication and that training needs or problems were potentially far ranging. Thus, we constructed the questionnaires so that the respondents could cite their preferences, needs, and problems concerning training without being constrained by telecommunication jargon and standardized training categories. We were not as concerned with statistical validity as with obtaining the honest perceptions of VR personnel about the real and ideal VR training environment.

Liaison had been established through at least one person in each survey state. In some cases, the liaison person was the State Training Officer and in some cases we dealt directly with the state VR or Blind Agency administrator. In all cases, the staff questionnaires were mailed to state agency personnel, who distributed them so that the state's geographic areas and all levels of staff were represented. Staff questionnaires were distributed to at least 10 percent of each state's field staff and, overall, we realized a 51 percent return rate (980 questionnaires sent, 500 returned). Each returned questionnaire was handled individually; then, responses were categorized by state.

A questionnaire was also sent to each state agency Training Officer in the survey state network. This questionnaire sought information on the present training available within the state and from regional sources, the cost of training per trainee, present training delivery methods, and the probable future directions of training in the state. Also requested were details about the states' available audiovisual equipment and any present use of telecommunication in training.

The third questionnaire was sent to directors or chiefs of training at all of the RRCEP's and R&T Centers to obtain information on training and training resources available to the states from these programs, as well as details of any present use of telecommunication in training. This part of the survey data is the least satisfactory because only 9 of 31 questionnaires were returned.

State agency staff survey. Results of the state agency staff questionnaire revealed that less than half of the 500 respondents were aware of how training needs were assessed in their states. They also reported a variety of ways in which they make their training needs known, including contact with supervisors, contact with training officers, at staff meetings and on post-training evaluations. Most of the staff respondents find out about available training from the agency training officer or staff development section; others mentioned staff memos, contact with their

supervisors, staff meetings, brochures, word of mouth, and professional associations as ways of finding out about available training.

Over half of the staff respondents believe their state agency is responsive to identified training needs. Twenty-one percent believed their state agency was not responsive to training needs.

With regard to convenience, 71 percent of the staff thought the training sessions were convenient, while 16 percent had some reservations (training sessions cause caseload back-up or they require too much travel) and 13 percent said it was inconvenient. In addition, over three-fourths of the respondents said they would take advantage of more training if it were offered at their job sites.

In every survey state, the state agency was cited as the primary training provider. Colleges and universities ranked second, followed closely by RRCEPs, and RTCs were fourth in amount of training provided.

Most training sessions are evaluated immediately following the training session either by questionnaire or printed evaluation form or by open discussion by the trainees. Other methods include a questionnaire mailed to trainees following the training session, pre- and post-tests, and analyzing the impact of training on job performance. About one-third of the staff respondents said training was good to excellent or made no suggestions for training improvements. Among the suggestions for improvement were more specific, practical and relevant information, longer and more advanced programs, more group participation, more specialists delivering training, and that a greater variety of media should be used. The best programs were described as practical and job-related, well prepared, relevant to clients, making good use of media and other visual aids, spread out over a time period that allowed trainees to digest the information, and providing hands-on experience.

When asked what the goals of staff training should be, skills knowledge and attitude change were most often cited by the respondents. Also cited were career development, communication within the agency, professional growth and sensitivity to clients.

Other sources of training utilized by staff included professional conferences and meetings, college and university programs, staff meetings and regional training conferences. Seventeen percent of the respondents said they did not participate in additional educational activities.

Counselor respondents were asked whether the certification and certification maintenance process might impact the availability, content, or format of needed training. Thirty-three percent of the counselors did not think there would be any impact; among those who anticipated impact (55 percent), the most frequently mentioned impacts were an increase in available training, that training will be required to meet specific standards, that training will be oriented to the certification requirements and that training will reach more people. Of the counselor respondents, 36 percent are certified (68 percent of those plan to be recertified) and 64 percent are not certified, although 27 percent of those plan to become certified and 22 percent may become certified.

State agency training officer survey. Most of the responding state agency training officers report well-defined methods of assessing needs for training, including statewide or local surveys, use of a training committee, individual needs assessment, and post-training evaluations. When asked how the range of training courses presently available matches up with expressed needs, most respondents indicated a good match in their states. Problems reported include too much retraining and not enough new training, increasing need for programs for support staff, and greater need for programs that develop skills as compared with providing general information. Orientation and training of new staff is sometimes a problem and is usually solved at the regional level.

With respect to convenience of times and locations at which available courses are scheduled, most respondents seemed satisfied, but some indicated that rural areas probably found scheduling to be inconvenient. Similarly, most thought courses were offered frequently enough.

Almost all respondents indicated that they communicated with other states in their region regarding staff training. Communication occurs through service on an RRCEP advisory committee, through meetings of staff development officers in the region, and through an annual staff development conference sponsored by an RRCEP. Interaction with the RRCEPs also occurs through participation in a needs assessment conducted by an RRCEP. State agency relationships with RTCs range from very little contact to use of training materials and services.

With regard to the goals they believed should be accomplished through staff training, training officer respondents most frequently mentioned improved services to clients, increased professionalism of staff and improved job performance. Also mentioned as training goals were sensitivity to the severely disabled, management training, career development and increased understanding of rehabilitation as a process.

Respondents offered a full range of answers when asked about the level of standardization achieved in their region and about comparable courses being offered in the several states within the region. However, there is almost total agreement that some degree of standardization of training is acceptable. Little standardization is achieved now except that which is encouraged by RRCEPs and their advisory committees, by national guidelines or by centralization of training within a state or region.

Most respondents said that some or most training is done in-house, that plans to do so are underway, or that this is a desirable goal when full-time trainers inside the agency can be authorized. Some respondents share or are willing to share programs within their region and within their state or agency. One respondent reported that all the training it sponsors is available for sharing, while another said little or no sharing takes place with other states. The fact that most respondents did not answer this part in the question suggests that sharing of agency-conducted training with other states is probably limited.

When asked about joint training efforts with other human service agencies, two respondents indicated that this did not occur, and several others said that it occurred occasionally or to some extent. In agencies that do report joint training, it took the form of cooperation with the Title XX training system; work with the division of the blind, school for the deaf, and state department of mental health; and use of VR agency staff as presenters for training offered by other state agencies.

Agency staff members who attend training programs are usually expected to provide feedback about the usefulness of the training. In some states, the feedback process is not systematic and varies according to the preferences of supervisors or the type of training taken or the level of employee. All respondents report that records are kept of staff participation in training.

Questions about how the effectiveness of training is evaluated elicited a full range of answers, including the use of questionnaires and rating sheets and pre/post testing. Trainees usually make the evaluation at the end of the training; some states also expect formal or informal supervisory reports or review training results with employees at the time of their performance evaluation. Most respondents said that evaluation of the content and instructor were done by the trainees at the end of training using a general evaluation form.

A number of factors impacting training were reported. There is wide variation among agencies in terms of minimum requirements for beginning counselor positions. The two most common basic requirements are a Bachelor's degree plus experience (six months to two years) or a Master's degree in rehabilitation. About half of the responding agencies said they have formal career development planning either on an individual employee basis or by position classification. State personnel systems may or may not affect career development planning within VR agencies. Impacts typically include determining qualifications and testing mechanisms for all state positions, requiring annual employee evaluations to address career development and various types of restrictions on attendance at training, by allowing only job-related courses or limiting the number of hours of training that may be taken.

Half of the survey respondents did not anticipate that any impact on training was likely to result from counselor certification/maintenance. Those who do anticipate impact think it will take the form of more and more formalized training within agencies, more participation in training by staff who have been reluctant to do so, increased need for standardization, more attempts to offer CEUs and to make arrangements with graduate schools, increased use of RRCEPs and more use of measurable training outcomes.

Some changes in VR legislation and priorities are expected to impact training, but there is not a consensus about what these changes might be. Independent living programs, service to the severely disabled and staff-related personnel rules were among those mentioned by respondents.

Local control of training within a state is not common, but local needs are recognized in a variety of ways, including allocation of central office funds by region and responsiveness to an employee whose training needs were specified in an individual development plan.

The time lapse between identification of a training need and availability of an appropriate program varies, but most states try to respond within one year.

Among the agencies responding to the DRI survey, the average mix of training delivery methods includes 10 percent via self-instruction packages, 73 percent via teacher-assisted instruction and 7 percent via telecommunications (including use of audiovisual materials). Most agencies make an audiotape or videotape of training programs when they are presented and most report that audio and video playback equipment is available and used at central offices and field sites. One agency has a fully equipped video production studio. Respondents seem to indicate a receptivity to use of telecommunication systems for training delivery but indicated that more information about such systems and demonstration of their cost-effectiveness must be provided.

Among the agencies participating in the DRI survey, total staff size (direct service providers, management/supervisors, clerical/support) range from 83 to 1,312 employees. Total agency budgets for training range from $7,500 to $525,600.

RRCEP and RTC survey. Although no specific questions addressing how needs were assessed were included in the DRI survey of RRCEPs and RTCs, a survey conducted by Susanne Bruyere of the Region X RRCEP produced information from RRCEPs on needs assessment. Her results show that eight RRCEPs have a uniform method of assessing training needs, three programs reported using advisory boards to assist in training needs definition, four used written surveys and one mentioned using a standardized interview approach.

With respect to convenience of times and locations at which available courses are scheduled, all respondents reported that training courses are generally held at central locations and trainees travel to the site. No special provision is made for employees located in remote areas.

All respondents reported working with state agencies in staff training in various ways, including needs assessment, setting priorities, development and delivery of training, training evaluation, conference development and technical assistance. In addition, three of the five responding RRCEPs and two of the four responding RTCs also provided training outside of the framework of their regular RSA funding, when justified by special need or request. With respect to how they work with other RRCEPs, RTCs and RRRIs (Regional Rehabilitation Research Institutes), all but one of the RRCEP respondents reported some cooperative relationship; in the form of previewing, reviewing and sharing programs, information exchange, and jointly sponsored conferences or short-term training.

In identifying and ranking the goals they thought should be accomplished through VR staff training, knowledge/information and skill gains ranked highest, followed by attitude changes, improved problem solving skills, professional growth, and increased awareness of the needs of the disabled.

Regardless of the number of courses offered, training budget or training staff, none of the respondents believe they are able to deliver training to meet all of the needs of rehabilitation personnel in their region. Reasons given include limited budget and training staff in relation to training needs, the fact that needs are not clearly defined for the various levels of staff, the diverse areas of information requiring attention, and the bureaucratic structure of VR and other governmental agencies.

When asked what percentage of their available courseware could be duplicated and shared with other regions, a wide range of responses, from a limited amount to 100 percent, were given by respondents. All believed sharing was desirable because it would allow economy of operation and because no one facility can command the degree and scope of training materials required for optimum training capability; these agencies believe that sharing resources would enhance their abilities to satisfy the training needs of professionals and trainees throughout the country.

Training effectiveness is evaluated in a variety of ways by the RRCEP and RTC respondents. These methods include use of the Training Evaluation Kit (TEK), verbal feedback, a state agency form for evaluation, follow-up questionnaires to participants and supervisors, pre/post tests, and questionnaires developed by the course director and staff that is specific to each course. One RRCEP does not evaluate training effectiveness at all.

For content, instructor and trainee satisfaction evaluation, two RRCEPs make use of the TEK, verbal feedback and observation during training. The other respondents use opinion surveys and verbal feedback following the training session. One RRCEP does not evaluate content and instructor by any means.

Respondents believed that certification and the certification maintenance process would impact training in several ways. These include increasing the number seeking to attend courses; the need to have courses "approved" as meeting the Commission on Rehabilitation Counselor Certification criteria; that the increase in demand for training will eventually generate competition among trainers and improve quality, and that it would have a positive effect on awareness of clients' needs and attitudinal shifts and it would broaden frames of reference for certified personnel.

The methods used by RTCs and RRCEPs to deliver training are primarily in-person lecture and seminar, but also include conferences, self-instructional materials, demonstrations and technical assistance. In most cases, there are only a few trainers (two to five in most RTCs and RRCEPs) to deliver training over an entire region. To make the most efficient use of available trainers, training is most often given in central locations requiring the trainees to travel to the training site.

Very little can be determined about the cost of training VR state agency staffs by RRCEPs and RTCs. RTC budgets are not broken down by specific function and it is unknown what proportion of the RTC training involves state agency staffs. RRCEPs, on the other hand, work primarily with state agency staffs; however, there is great diversity between RRCEPs in per trainee costs that cannot be explained in terms of number or complexity of courses offered. In addition, except for very rough estimates, training delivery costs and training materials development costs are unknown by the respondents.

With regard to staff available to give training, the RRCEP respondents reported a range of two to four trainers on their staff to deliver 20-40 courses a year. The number of employees receiving training varied from 400 to 1,200. The three RTCs responding to this question reported having two, seven, and 55 trainers on their staff to deliver 55, 40, and 50-60 courses per year, respectively. The number of employees trained ranged from 133 to 595 per year. It should be noted that it appears that the 55 trainers employed by one RTC also carry out other training not part of RTC responsibility.

General conclusions about training. Among the conclusions suggested by the survey data, intensive study in two pilot states and the literature are: that VR and blind agency staff members are very interested in training and articulate in stating their concerns and needs; that state agencies are more important in staff training than might have been expected; and that Research and Training Centers appear to be bigger, have more trainers, more ability to produce training materials and more and better access to specialists than do other VR units. In contrast, the Regional Rehabilitation Continuing Education Programs seem to be less than innovative with respect to staff training programs and much involved with many other activities, including degree programs and special contract work for the states in their region. They have small numbers of trainers and, for the most part, are not involving instructional designers, graphics specialists and persons with expertise in adult or continuing professional education in their training efforts. These competencies will be needed if a wider range of program formats, levels of training and access to specialists are to be provided. The increasing use of telecommunication-based delivery systems will encourage a team approach to training development, some standardization of training and much greater sharing of resources. Rehabilitation Engineering Centers and Regional Rehabilitation Research Institutes should provide their expertise to staff training efforts as should personnel from private sector agencies.

An example of each questionnaire may be found in Volume I, Appendix A. Detailed results of these questionnaires may be found in Volume I, Appendices B-D.

Analysis of telecommunication alternatives. In addition to the results of the training surveys, pertinent VR literature was used to determine the potential telecommunication alternatives best suited for VR staff training. For example, the Arkansas R&T Center, in a 1975 study titled Participation by Vocational Rehabilitation Personnel in Rehabilitation Training, found that:

- There is a need for increased communications among agencies and training resources;
- There is a tremendous range in the types of training programs being conducted, which led to the assumption that considerable thought and effort are being devoted to the preparation of different training programs to accomplish similar objectives; and
- It appears both feasible and cost-effective to seek more standardization in rehabilitation training.

The situation has not changed dramatically since 1975 and these specific training problems still exist. These problems increase the potential of telecommunication to be cost-effective in VR staff training delivery.

Another study, performed at USC's Center for Communications Policy Research, involved a national mail survey of state rehabilitation administrators, counselors, and facility directors in order to elicit their attitudes toward telecommunication. Part of this survey contained short scenarios describing an organizational need, and respondents were asked to indicate their most and least preferred technological solutions. The staff training scenario put the respondent in the position of being responsible for providing a two-hour in-service training program to all of the professional staff in his/her agency. Face-to-face training sessions were not feasible as more people needed to be reached than time constraints would allow if "in person" sessions were held. The administrators were then given five alternatives to in person sessions including teleconference, broadcast television, broadcast radio, closed circuit television, and videotape. The administrators overwhelmingly preferred closed-circuit television, with the teleconference and videotape running close seconds.

These and other information sources* were used, in conjunction with the surveys, to identify the telecommunication alternatives with the potential for satisfying the staff training needs and administrative preferences in vocational rehabilitation.

In analyzing the costs and effectiveness of educational programs in order to make comparisons between alternative telecommunication delivery mechanisms, both historical and current operational data concerning the developmental and operational costs of programs must be described. Such data includes program descriptions including objectives, anticipated outcomes, implementation and operational activities, resource requirements and characteristics, effectiveness measures (e.g., pre- and post-tests), and both capital and operating costs.[1] In VR, there are special problems in describing programs and in documenting the costs of staff training. For example, the educational requirements for employment in the VR system are widely varied, requirements for entry into staff training are minimal, it is difficult to document the gains in trainees' earnings due to training or to measure their increase in efficiency or effectiveness, trainees may be in jobs in which the knowledge and skills gained are not used, and although most costs are incurred at the time of training, benefits may last for many years.[2]

Perhaps the greatest obstacle to cost-effectiveness analysis in this study is the absence of baseline data concerning both costs and effectiveness of training in VR. These data, and not necessarily from every state agency, Regional Continuing Education Program, and Research and Training Center, would help determine whether a particular telecommunications-based delivery system designed for a specific part of the country was, at a given point in time, cost-effective. It should also be noted that it is difficult to isolate training costs for state agency personnel (the target of study in this project) from training costs for all VR personnel. Thus, the discussions of telecommunications methods and costs are, of necessity, more general than might be possible if all specifics were known.

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*Other sources included the USC study, Research to Assess the Barriers to Effective Utilization of Telecommunications in State Vocational Rehabilitation Agencies, the National Clearinghouse of Rehabilitation Training Materials, the Journal of Rehabilitation Administration, American Rehabilitation, and the Informer, among others.

In defining the parameters of the analysis of telecommunications alternatives, several assumptions were made: that the VR community has a positive attitude toward the use of telecommunications; that some portion of the dollars now being spent on staff training can be committed to delivering that training using telecommunications-based systems, in part; and that training programs are available for delivery by telecommunication. Once these criteria are met, then selection of telecommunication options depends on the following variables:

a. geographic dispersion of audience;
b. number and length of sessions needed to complete training;
c. number of sites;
d. group vs. individual audiences;
e. need for immediacy;
f. need for visual contact;
g. need for two-way contact;
h. need for hardcopy materials distribution.

Several additional assumptions were made concerning these variables:

- With respect to variable b, that two hours are the maximum amount of telecommunications use feasible per training session and that three such two-hour sessions are the maximum for any staff training program.
- With respect to variable e, the need for pre-scheduling is assumed.
- With respect to variable h, that this is a non-telecommunications problem.
- That the rate of increase in availability of satellite earth stations is greater than the rate of expansion of microwave systems.
- That the focus of this analysis should be on delivery of visual messages because the costs of audio-only systems are well known.

The two high potential training need areas on which the potential telecommunications delivery systems will focus are: secretarial training in vocational rehabilitation concepts and training which provides advanced knowledge of specific disabilities. These two areas were selected for potential telecommunications delivery from the list of high potential training needs identified in the DRI survey because: secretaries are the first VR contacts for many clients, secretaries are so indispensable to daily office operation that training sessions requiring time away from the

office may be difficult to justify, most present training provides only general knowledge about various disabilities, and advanced knowledge about specific disabilities must necessarily be supplied by experts.

Following identification of training needs, the next task is to select an appropriate telecommunication delivery system. The delivery system will typically consist of two elements: intermediate delivery technology and viewing site delivery technology. Intermediate delivery methods are defined as alternative ways of sending video programming from an originating point to local telecommunication systems for distribution to local vocational rehabilitation viewing sites. The intermediate methods selected as examples in this report are AT&T land lines (video capable), satellites and common carrier microwave. Viewing site delivery methods include common carrier Multipoint Distribution Service (MDS), cable television, Instructional Television Fixed Service (ITFS) and over-the-air commercial video transmission. Since this report focuses on delivery of visual training messages, the only criterion needed to select the desired delivery system is cost. The delivery system which gets the training programs to the desired training sites at the lowest cost is the one that should be selected by vocational rehabilitation personnel for accomplishing telecommunications-based training.

A series of break-even analyses are presented in Tables 3-7 of Volume II to compare the relative cost of various intermediate delivery technologies. The most cost-effective means of intermediate delivery, however, cannot be determined until a number of decisions have been made by the user group. These include: (1) the number of video training receive sites, (2) the number of hours the system will be used per month, (3) the number of total miles in the delivery system and (4) the time of day and the day of the week that the programming is transmitted.

The information provided in Tables 3, 4, and 5 compares the cost of delivering video programming via AT&T land lines and domestic satellite. During prime time (4 p.m. to 2 a.m. Eastern Time, Monday-Friday) intermediate delivery via satellite becomes cost-effective when the total distance the message will travel is relatively large and/or when the number of sites simultaneously receiving the message approaches 15 (see Table 3). Conversely, daytime and earlybird users (12 p.m. to 4 p.m.

Eastern Time, Monday-Friday and 2 a.m. to 12 p.m. Eastern Time, Monday-Friday, respectively) will almost always find it more cost-effective to send video signals via domestic satellite (see Tables 4 and 5).

Table 6 compares the cost of intermediate delivery via common carrier microwave and domestic satellite. The results indicate that domestic satellites become more cost effective at a relatively short distance between the transmission and receive sites. Additionally, as the number of receive sites increases, the break-even mileage increases but at a decreasing rate. Consequently, as the number of receive sites used in training increases, it becomes more likely that intermediate delivery via domestic satellite will be more cost-effective than delivery via common carrier microwave.

Finally, Table 7 compares the cost of delivery via AT&T land lines with delivery via common carrier microwave. For delivery to two sites with a total distance of more than 142 miles, or for delivery to six sites with a total distance of more than 426 miles, common carrier microwave is a cheaper proposition than AT&T land lines. These examples show the kinds of considerations necessary in determining the best intermediate delivery mechanisms. Decisions on the method best suited to a particular situation will necessarily depend on the variables of that situation. A variety of specific demonstration configurations are discussed in Volume II along with the most cost-effective methods of delivering training for each configuration.

After the most cost-effective means of intermediate delivery has been determined, the next step is to select a method for training program delivery to the viewing sites. Since the alternatives (shown in Table 2, Volume II) are provided on a cost per hour basis, the most cost-effective methods for on-site delivery can be rank ordered readily: (1) cable television and/or ITFS, (2) common carrier MDS, and (3) over-the-air commercial video transmission. If cable or ITFS are not available for on-site delivery, it is expected that renting a portable videocassette recorder and color monitor for final site delivery would be a cheaper proposition than MDS or over-the-air commercial video transmission.

Each of the intermediate and viewing site technologies, as well as the delivery variables, are discussed in detail in Volume II, Part A.

Since telecommunication technology is not widely used by vocational rehabilitation service deliverers, a number of obstacles must be overcome prior to its adoption. The most important obstacles to increased VR telecommunication service delivery are: inadequate dollar commitment to try something new, and failure to adapt VR services for delivery via nontraditional means. These obstacles must be overcome before staff training can take place via a telecommunication delivery system.

Any demonstration project undertaken as a result of this report must be committed to a systematic approach to gathering cost and effectiveness data relative to the demonstration. Without such a commitment, it will be impossible to make a meaningful comparison among the experimental treatments. In order to facilitate the process of gathering cost data, it is recommended that a set of ledger accounts be established to keep track of all demonstration financial transactions.

The relevant effectiveness criteria cannot be identified a priori. However, it is recommended that those involved with the training demonstration identify and rank-order the goals of each video training course at an early point in the course development process. This will greatly facilitate the development of pre- and post-test instruments designed to measure the effectiveness of each experimental treatment.

In short, careful record keeping is an essential ingredient of cost-effectiveness analysis. Since such care has not typically been characteristic of VR staff training efforts, as evidenced by our survey results, demonstration projects in this area should be especially concerned with record keeping aspects.

The analysis of the telecommunications alternatives as well as a discussion of their cost effectiveness may be found in Volume II of DRI's final report to the Rehabilitation Services Administration.

State and federal factors affecting the use of telecommunication. This task was undertaken to provide a brief overview of contemporary telecommunication issues and challenges, of the complex relationships among telecommunication users, providers, and regulators, and of the impact of these relationships upon state governments. A special attempt was made to determine whether or not there might be legislation at the

state level that could either facilitate or interfere with the development of public sector telecommunication applications, especially when multistate and multiagency arrangements might be necessary. It was determined that both kinds of legislation exist, in varying patterns, in the 12 states under consideration. These 12 states include the 11 states included in the DRI/RSA research project, plus Alaska, which was included because of their innovative use of public telecommunications applications.

Four specific areas were examined to identify existing state legislation and regulations and are detailed for each of the 12 states. These areas are:

1. State administrative telecommunications management
2. State authority for public/educational braodcasting
3. State regulation of cable television
4. State regulation of telephone service

The results of this investigation reflect the varying patterns of involvement from state to state. However, one overall conclusion that might be drawn is that any agency seeking to develop public sector telecommunication applications, whether for a single-state or multi-state program, must examine carefully not only the extensive body of federal communications law and regulations, but also the patchwork quilt pattern of state law and regulation, all of which is currently in a state of flux.

In addition to investigation of state legislation and regulation regarding telecommunication, a review of recent telecommunication activities in both the federal and private sectors was undertaken. Several of these activities will have significant impact on the development of both public and private sector telecommunication applications and are highlighted below.

A federal reorganization initiative in early 1978 resulted in the creation of a new communications policy agency, the National Telecommunications and Information Agency (NTIA), within the Department of Commerce. The NTIA has both policy and research responsibilities and is strongly focused on analyzing the potential impacts of new

technologies and networking configurations. These user-oriented interests are the prime responsibility of NTIA's applications division, and represent growing federal concern for providing communications users with improved levels of service, and with alternative service systems at reasonable prices.

Closely related to the NTIA reorganization is a congressional initiative to undertake a major rewrite of the Communications Act of 1934. The Communications Act is outdated not only in the technological sense (it does not deal effectively with the substantial technological changes which have occurred since 1934), but also in that it does not allow for a central communications policy mechanism, which is urgently needed at present. The overall intent of the rewrite is to eliminate the outdated communications regulatory structure so that the U.S. may move quickly into a new era of communications growth and development based on more effective use of the emerging technologies. The bill proposes a major deregulation of the communications industry coupled with an effort to stimulate competition and innovation. If passed, the rewrite would result in major changes in the availability of communications services to both the private and public sectors.

A related bill, the Public Broadcasting Financing Act of 1978, was signed into law in November 1978. This legislation increased public accountability of the public broadcasting system, maintained advance funding for public television and radio, and realigned several roles within the public broadcasting environment. Of significance in this act is the authorization of a public telecommunications facilities program, which will provide planning and construction funds for increasing both broadcast and limited broadcast services to the public, especially in areas not presently receiving public broadcast service.

In January 1979, the Carnegie Commission on the Future of Public Broadcasting issued its final report, entitled A Public Trust, which recommends a major reorganization of public television and radio and an increase in funding from its 1977 level of $482 million to around $1.2 billion by 1985. This privately funded report is intended to provide a focal point for federal planning of future directions for

national public broadcasting. Central to the Commission's report is the establishment of a Public Telecommunications Trust, to replace the Corporation for Public Broadcasting. This new trust, a private, non-profit entity to be generated by federal law, would serve as the major planning agency for public broadcasting. Federal funding support by 1985 would be $630 million, with an additional $570 million to be derived from business, foundations, state and local governments, and private contributions.

Another development affecting telecommunications use is a recently established federal entity, the Interagency Committee on Satellite Communications Applications. This committee is studying user needs, systems requirements, procurement problems, and operations/management considerations in order to plan for effective use of satellite communications. The research and development activities fostered by this committee may ultimately result in providing new and improved communications services not only to the selected federal agencies represented on the committee, but also to other user communities, both public and private.

Recent activities in two states, Virginia and North Carolina, reflect growing concern and needs in state government telecommunications. In 1972, the Virginia General Assembly created the Virginia Public Telecommunications Council (VPTC) to manage and coordinate the Commonwealth's investments in, and uses of, telecommunications services. This legislative action created the only agency among the 50 state governments with comprehensive responsibility for state telecommunications, and represents a highly significant development in this area. Virginia also established a Telecommunications Study Commission whose responsibilities include evaluating the use and effectiveness of public telecommunications services, and the mechanisms for allocating funds for these services and facilities; making recommendations as to the most cost-effective use of public telecommunications in the Commonwealth and as to the proper location for the administration of state programs related to public telecommunications, and advising the VPTC as to any revisions or modifications of the Master Plan for Telecommunications related to facilities, services, or programs. The Commission

is required to report its findings and recommendations by December 1, 1979. These findings, when released, may include significant information concerning the feasibility of a comprehensive state telecommunications agency.

In early 1978, the North Carolina Department of Administration undertook a privately funded, comprehensive study of the current status of public telecommunications in North Carolina. A 23-member Task Force on Telecommunications was created to evaluate new developments in telecommunications and to recommend legislative and administrative changes. The Task Force organized itself into four areas, focusing on emerging technologies, facilities, laws and regulations, and services. This initiative ranks with Virginia's in being of great significance to state governments vis-a-vis their recognition of the need to undertake comprehensive studies of the impact of telecommunications on state agencies.

Overall, state problems in dealing with telecommunications issues and problems center on a lack of effective mechanisms to facilitate improved intergovernmental cooperation, coordination, and information sharing. Because many telecommunications problems facing state governments, whether they be policy-oriented, managerial, fiscal, organizational, or technological, are larger problems than any state can solve alone, states need to know more about what other states are doing in telecommunications and need to work together in order to solve problems which they share in common.

The fast-paced development of communications networks by the private sector should help to facilitate increased use of and cooperation in telecommunications among states. The development of these networks has resulted in the introduction of an amazing variety of communication products and services aimed at capturing a share of the expanding market for data, voice, video, and facsimile transmission capabilities. Based upon innovative applications of existing and emerging technologies, these new products and services offer communications users unprecedented opportunities for access to improved equipment, more effective transmission methods, and decreases in prices and unit costs of operation.

Video production. In DRI's original proposal, a small amount of money was budgeted to develop a 15 minute slide/sound show describing the project, introducting telecommunication concepts, and highlighting the results of the project. Prior to initiating this task, a teleconference was held with Advisory Committee member in order to obtain a consensus on the appropriate audiences, content, and format for the media production.

During the teleconference, committee members determined that the most important audiences are state VR administrators and policy makers, with state central office staffs and training officers as the secondary audience. It was also decided that a slide/sound show format that could subsequently be transferred to videotape by adding the necessary transitions and music would be the most efficient and useable format for the media products.

In terms of content, the Committee decided that a general introduction to telecommunication with examples of applications that are meaningful to VR administrators and staff would be more useful than the proposed content of primarily highlighting the project and its results.

With encouragement from the RSA program officer, the Committee also recommended obtaining additional funding in order to produce a better quality program than possible with existing funding. A proposal amendment requesting additional funding was prepared, approved by the Advisory Committee, and submitted to RSA. One of the three program and budget options in the amendment was agreed to by RSA, enabling the production of two sound/slide shows and a videotape.

Following the amendment approval, a Content Committee of four persons comprising media and VR training specialists was formed. This committee gave direction to the specific content and types of telecommunication examples appropriate for the intended audience. A list of the Content Committee members may be found at the end of this summary.

Following our meetings with the Content Committee, a draft content outline followed by a preliminary audio script were sent to and approved by the Advisory Committee.

The resulting media products include a sound/slide presentation in a single tray/single screen configuration; a sound/slide presentation in a three projector dissolve/single screen configuration; a videotape program that is a specially modified version of the three projector presentation; and support materials in the form of an audio cassette of program soundtrack, printed script of the program, and related information. The three projector/single screen sound slide show and the videotape are targeted at VR administrators, policy makers, and legislators; while the third program is thought to be especially useful for VR administrators to use within their states with advisory boards, legislative staffs, VR staffs, and others.

One hundred copies of each volume of the Final Report and masters/copies of the audiovisual programs have been delivered to the Rehabilitation Services Administration. Contact: Lita Colligan, RSA, HEW South Building, Washington, D.C. 20201

A limited number of copies of the executive summary are available at the Denver Research Institute. Contact: Dr. Ruth M. Katz, Denver Research Institute, University of Denver, Denver, Colorado 80208

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ADVISORY COMMITTEE--DRI TELECOMMUNICATIONS
AND VR STAFF TRAINING PROJECT

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Mr. William Morgan Region III Office of Rehabilitation Services	Training (Region III)
Mr. Arnulfo Zamora Region VIII Office of Rehabilitation Services	Training (Region VIII)
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Mr. Morris Hansen Division of Rehabilitation Services Utah State Board of Education	Training (Utah)
Mr. Delbert E. Frost Rehabilitation Division Nevada Department of Human Resources	CSAVR Personnel and Training Committee, State Agency (Nevada)
Mr. Carroll Hostetter Social and Rehabilitative Services Oklahoma Department of Institutions	State Agency (Oklahoma) "barriers" project
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Dr. Louis Bransford Public Service Satellite Consortium	Telecommunications, Education, National Advisory Committee for White House Conference on the Handicapped
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Mr. William Watson Division of Vocational Rehabilitation Department of Education	Counseling
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Public Service Satellite Consortium

*This committee was formed to provide advice and direction on content, format, and audience for the project's audiovisual productions following initial input from the project Advisory Committee.